October 28, 2006

ER291-003
Spring 2007, 3 units
CCN 27441

Design for Sustainable Communities

Professor Ashok Gadgil
Lectures: Wed.10 to 12Noon. 106 Moffit
Discussion sessions: Mon. 10 to 11 AM, 54 106 Moffit

This course provides concepts and hands-on design experience with innovative products or processes for improving sustainability of communities. The focus will be resource-constrained communities (mostly poor ones in the developing countries). Teams of three or four students each will take on separate practical projects, with guidance from subject experts, to help mature technical/scientific innovations into useful products or processes.

Above: Darfur refugee shelters

Lectures will introduce relevant concepts and analytical tools on a parallel track as the student team develop their projects. Lectures will address topics such as sustainability, relevant aspects of economics, sociology of innovation diffusion, product design principles, and walk through a few selected examples of successes and failures. We will also discuss readings during the lecture hours. Projects will include designing, and/or building and/or testing prototypes. (We will have modest funds to support each team's actual project expenses). Each team will report to the class three times during the semester – first on problem selection and its relevance and background and team's goals, a mid-semester presentation on the progress to date and problems encountered, and a final presentation with display of the conceptual design, prototype and/or test results.

Above: Khartoum worker displays efficient cookstoves made for shipping to Darfur, based on student work in Spring 2006

Student teams will have the option to define their own project with the instructor's approval, or may choose from a variety of existing opportunities. For every project, a research mentor is required. In Spring 2006, projects included designing a cookstove for refugees in Darfur, testing and screening components for a high-performance low-cost dwellings for disaster survivors, and the design of a sustainable bungalow in Moorea, Tahiti.

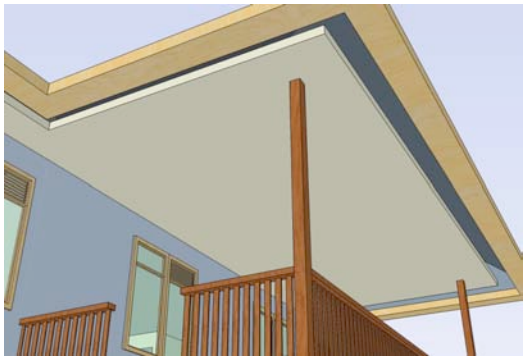
To earn credit, the students are expected to participate in class discussions, distribute to the class (by e-mail) a weekly "reflection" of 200-400 words on what they learned during the week, participate in preparing and making the team presentations, and work closely as a team in defining the problem, designing a technical solution, and building/testing a prototype.

This is the second time this course will be taught, so the course may change slightly from the schedule, and may have some mid-course fine-tuning based on student inputs and instructor assessment. We will also try to accommodate a guest lecturer or two – this also might change the schedule somewhat.

Above: House made from foam-core panels.
Design intended for Afghanistan refugees

Prerequisites: Graduate student standing, or consent of instructor.

Past students have come from ERG, Engineering, Physics, Architecture, and ESPM, and have all found the course within reach, with some effort.



Design changes in Moorea houses for improved thermal performance.
Student work in Spring 2006

(This course may get cross-listed in the College of Engineering in the near future, with a different course number and a different CCN. However the same limit on total student enrollment will apply.)

Textbooks (available from Amazon.com and elsewhere) **:**

1. **P. Sainath, "Everybody Loves a Good Draught" (2002). Penguin Paperback.** ISBN: 0140259848

2. **Donald Norman, "The Design of Everyday Things" (2002). Basic Books.** ISBN: 0465067107